

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 15-33 are pending in the present application, Claims 24-31 and 33 having been amended. The amendments to Claims 24-31 and 33 only remove reference numerals and do not add new matter

In the outstanding Office Action, the Abstract was objected to; Claims 15 and 24 were rejected under 35 U.S.C. §103(a) as unpatentable over Kochiyama et al. (U.S. Patent No. 5,400,036, hereinafter Kochiyama) in view of Wagstaff et al. (U.S. Patent No. 6,356,510, hereinafter Wagstaff), and further in view of Stein (U.S. Patent No. 4,714,802); and Claims 16-23 and 25-28 were objected to for depending from a rejected base claim, but were otherwise indicated as including allowable subject matter.

Applicant notes that Claims 29-33, which were added by the amendment filed on September 27, 2005, were not addressed in the outstanding Office Action. Claims 29-33 are apparatus claims corresponding to means-plus-function Claims 24-28, and are assumed to be rejected or objected to for the same reasons as means-plus-function Claims 24-28.

Applicant thanks the Examiner for the courtesy of an interview extended to Applicant's representatives on January 27, 2006. During the interview, differences between the present invention and the applied art, and the rejections noted in the outstanding Office Action were discussed. No agreement was reached pending the Examiner's further review when a response is filed. Arguments presented during the interview are reiterated below.

Applicant thanks the Examiner for the indication of allowable subject matter. However, these claims have been presently maintained in dependent form because Applicant considers the pending independent Claims patentably distinguishing over the applied art.

With respect to the objection of the Abstract, a new Abstract is provided which corrects the informality identified in the outstanding Office Action. Accordingly, Applicant respectfully submits that the objection to the Abstract is overcome.

The specification is amended to include section headings as requested by the Examiner during the above-noted interview.

With respect to the rejection of Claim 15, Applicant respectfully traverses the rejection because the outstanding Office Action fails to provide a *prima facie* case of obviousness by asserting prior art that, no matter how the prior art references are combined, does not teach every element of independent Claim 15.

To establish a *prima facie* case of obviousness, MPEP §2143 requires that three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the references teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim elements. The outstanding Office Action is deficient with respect to the first and third requirements.

Briefly recapitulating, Claim 15 is directed to a method of estimating a channel and a direction of arrival of a signal received by an array of antennae after being propagated along at least one path. The method includes, for each path, a first step of estimating for each antennae in the array a total phase difference from a signal received by each antennae. The method also includes the step of estimating the angle of arrival of the signal, as well as a phase rotation undergone by the signal along the at least one path, using each of the antennae total phase differences determined in the first step. The method also includes a third step of estimating an attenuation undergone by the signal along the at least one path from estimated values of the phase rotation and the angle of arrival.

In a non-limiting embodiment of the claimed invention, the attenuation that is evaluated is defined by equation 2 on page 6 of the present specification. In the non-limiting embodiment of the claimed invention, the attenuation is the channel attenuation affecting the signal. Equation 2 shows that the attenuation is multiplying the useful signal together with a phase rotation associated with each antenna and specific to the signal direction of arrival. A noise term is added afterwards. Wagstaff only works on r_i , the magnitude of the received vector. Wagstaff uses the magnitude of the received vector (r_i), together with the phase variations of the received signal, to evaluate noise power. Wagstaff is addressing a different problem. In equation 2 of the present specification, Wagstaff would help in evaluating the $n_i(t)$ term (the noise), but not the $a(t)$ term (the attenuation).

Claim 15 recites, *inter alia*, “a third step of estimating an attenuation (α) undergone by the signal along the at least one path from estimated values ($\hat{\nu}, \hat{\theta}$) of the phase rotation (ν) and the angle of arrival (θ).” The outstanding Office Action acknowledges that Kochiyama does not describe or suggest this element of Claim 15.¹ The outstanding Office Action relies on Wagstaff and Stein to describe this element of Claim 15.

The outstanding Office Action takes the position that Wagstaff describes estimating the attenuation undergone by the signal along the path from the estimated values of the phase rotation.² During the interview, the Examiner took the position that Wagstaff inherently discloses estimating how much to attenuate a noise and clutter signal. Applicant respectfully traverses this position.

When rejecting Claim 15, the outstanding Office Action relies on col. 6, lines 30-34 of Wagstaff. Col. 6, lines 30-34 disclose that “a processor can be developed which attenuates noise and clutter signals, based on the magnitude of the excess phase rotation angle.”

¹ Office Action, page 3, paragraph 10.

² Office Action, pages 3-4, paragraph 11.

In the claimed invention, a signal is received by an array of antennae. The signal is attenuated as it propagates to the array of antennae. It is this attenuation that has been undergone (i.e., already occurred) by the signal along the path to the array of antennae that Claim 15 is estimating.

On the contrary, Wagstaff discloses that a signal can be attenuated by a processor based on the magnitude of excess phase rotation. The excess phase rotation is representative of the noise in the signal.³ There is no description or suggestion in Wagstaff that the processor estimates an attenuation *undergone* (i.e., already occurred) by the signal.

During the above-noted interview the Examiner took the position that Wagstaff inherently discloses estimating how much to attenuate the signal to reduce the noise and clutter in the signal. Even if the Examiner were correct that Wagstaff inherently discloses estimating attenuation to be applied to a signal, this would be an estimation of attenuation that has not yet occurred, which does not describe or suggest the claimed estimating attenuation *undergone (i.e., has occurred)* by the signal along the at least one path.

Using the Examiner's rationale, the processor in Wagstaff would estimate the attenuation before applying the attenuation to the signal. However, Claim 15 requires an estimation of attenuation *undergone* by the signal (*not* to be applied to the signal) along the at least one path. In the claimed invention, the attenuation of the signal that is being estimated has already occurred.

Furthermore, the outstanding Office Action states "Wagstaff suggests the beneficial use of estimating attenuation from the phase rotation such as to attenuate noise and clutter signals."⁴ However, "estimating attenuation from the phase rotation" is a subjective conclusion apparently drawn from Wagstaff's disclosure of "a processor can be developed which attenuates noise and clutter signals, based on the magnitude of the excess phase

³ Wagstaff, col. 9, lines 26-29.

⁴ Office Action, page 4, paragraph 11.

rotation angle.” The outstanding Office Action provides no explanation of how the subjective conclusion of “estimating attenuation from the phase rotation” is reached.

In this regard, it is noted that substitution of an improper subjective conclusion as to knowledge in the art for concrete evidence of such knowledge relative to a core factual finding required for a determination of patentability is clearly improper. See *In re Zurko*, 59 USPQ2d 1693, 1697-98 (Fed. Cir. 2001) as follows:

Finally, the deficiencies of the cited references cannot be remedied by the [PTO’s] general conclusions about what is “basic knowledge” or “common sense” to one of ordinary skill in the art. As described above, the [PTO] contended that even if the cited UNIX and FILER2 references did not disclose a trusted path, “it is basic knowledge that communication in trusted environments is performed over trusted paths” and, moreover, verifying the trusted command in UNIX over a trusted path is “nothing more than good common sense.” *Ex parte Zurko*, slip op. at 8. We cannot accept these findings by the [PTO]. This assessment of basic knowledge and common sense was not based on any evidence in the record and, therefore, lacks substantial evidence support. As an administrative tribunal, the [PTO] clearly has expertise in the subject matter over which it exercises jurisdiction. This expertise may provide sufficient support for conclusions as to peripheral issues. With respect to core factual findings in a determination of patentability, however, the [PTO] cannot simply reach conclusions based on its own understanding or experience — or on its assessment of what would be basic knowledge or common sense. Rather, the [PTO] must point to some concrete evidence in the record in support of these findings. [Emphasis added.]

Furthermore, during the above-noted interview that the Examiner took the position that estimating attenuation undergone along the at least one path is inherent in *Wagstaff*.

No rationale for a finding of inherency has been set forth. “The fact that a certain result may occur or be present in the prior art is not sufficient to establish inherency of that result or characteristic.”⁵ “To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the

⁵ *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1995, 1957 (Fed. Cir. 1993).

reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.”⁶ Because the Official Action provides no explanation of why Applicants’ claimed features are inherent, Applicants submit the rejection is improper.⁷

The outstanding Office Action also takes the position that Stein describes estimating the attenuation undergone by the signal along the at least one path from the estimated values of the angle of arrival.⁸ Applicant respectfully traverses this position.

In support of this position, the outstanding Office Action relies on col. 8, line 66 to col. 9, line 1 of Stein. Col. 8, line 66 to col. 9, line 1 of Stein recites “said arriving information signal arrives from said first direction when said first comparing means determines the magnitude of the attenuation information signal to be greater than said first threshold value.” This does not equate to estimating an attenuation undergone by the signal along the at least one path from estimated values of the angle of arrival.

Stein deals with a coupler of a local area network (LAN), i.e., of a wired system, whereas the claimed invention deals with a wireless signal received by antennas. The coupler in Stein may arrive from different directions. Direction, as used in Stein, does not have anything to do with the angle of arrival of a wireless signal. The coupler determines the direction of the signal. Furthermore, to determine the direction of the input signal, the coupler attenuates the signal by a predetermined attenuation, depending on the direction of arrival, in order to perform a threshold comparison.

For example, Stein discloses determining whether a signal received at a node is received from a first or second source direction. A direction sensitive coupling unit has two

⁶ *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).

⁷ MPEP § 2112, IV “Examiner must provide rationale or evidence tending to show inherency.”

⁸ Office Action, pages 3-4, paragraph 11.

ports. Transmissions originating from the right end direction are transmitted to a voltage sensitive unit with a relatively great degree of attenuation. Transmissions originating from the left end direction are transmitted to a voltage sensitive unit with the most attenuation, relative to the other transmission. The voltage sensitive unit monitors the voltages of the signals and determines which port they entered based on the voltage of the attenuated signal compared to a threshold.⁹ Thus, Stein discloses determining direction by measuring an attenuated signal and comparing the attenuated signal to a threshold.

In summary, Stein attenuates a signal, and compares the attenuated signal to a threshold value to determine a direction of arrival of the primary signal. The claimed invention, on the contrary, the signal is not voluntarily attenuated. The attenuation provided by the wireless propagation channel is undergone by the signal. In the claimed invention, attenuation is evaluated, but the claimed invention does not introduce the attenuation. The claimed invention uses angle of arrival to estimate attenuation of a signal undergone as the signal travels along the at least one path. Stein does not disclose or suggest estimating attenuation undergone along the at least one path from estimated values of the angle of arrival.

The outstanding Office Action appears to take the position that in Stein, the signal undergoes an attenuation, which creates an attenuated signal, and an estimate is made of the attenuated signal. However, the attenuation is determined by the coupler. The attenuation in Stein is a parameter, and is not estimated from the received signal. Rather, the attenuation in Stein is predetermined.¹⁰

In the claimed invention, the attenuation arises from the propagation path. The attenuation is not introduced. The attenuation is a random value and not a parameter. The attenuation must be estimated from the received signal.

⁹ Stein, col. 4, lines 31-53.

¹⁰ *Id.*

During the interview, the Examiner took the position that claimed invention is a mere reversal of Stein and cited *In re Einstein*, 8 USPQ 166 to support a position that a mere reversal of essential working parts of a device involves only routine skill in the art. Applicants respectfully traverse this position.

The differences between Stein and the claimed invention are not a mere reversal of essential working parts. Stein and the claimed invention are different approaches to different problems. The claimed invention is directed toward a novel and non-obvious method of estimating the direction of arrival and characteristics of the transmission channel, such as attenuation of the signal along the at least on path, phase rotation, and angle of arrival.¹¹

The essential purpose of Stein is to determine *the source direction* (not to estimate attenuation) of local area network transmissions.¹² The device disclosed by Stein cannot be reversed to estimate attenuation based on direction of arrival. Doing so would lead to a non-sensical and non-working device. MPEP §§ 2143.01(V) and (VI) state that “if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification,” and “if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious,” respectively. Any suggestion to modify Stein to estimate attenuation based on source direction would be improper as it would change the principal of operation of Stein and would render Stein unsatisfactory for its intended purpose. Thus, Applicant submits it is only through an

¹¹ Specification, page 2, lines 6-8.

¹² Stein, title, Abstract, col. 1, lines 9-10, col. 2, lines 1-6, and col. 2, lines 35-38, for example.

impermissible hindsight reconstruction of Applicant's invention that the rejection of Claim 15 can be understood.¹³

Furthermore, Applicant notes that Claim 15 requires that attenuation be estimated from values of **both** phase rotation and angle of arrival. The outstanding Office Action attempts to show that Wagstaff discloses estimating attenuation from phase rotation and that Stein discloses estimating attenuation from angle of arrival. However, the outstanding Office Action provides not motivation to combine Kochiyama with both Stein and Wagstaff.

In effect, the outstanding rejection does little more than attempt to show that parts of the inventive combination of Claim 15 were individually known in other arts and to suggest that such a showing is all that is necessary to establish a valid case of *prima face* obviousness. The PTO reviewing court recently reviewed such a rationale and dismissed it in *In re Rouffet*, 149 F. 3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998) as follows:

As this court has stated, "virtually all [inventions] are combinations of old elements." *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 698, 218 USPQ 865, 870 (Fed. Cir. 1983); see also *Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1579-80, 219 USPQ 8, 12 (Fed. Cir. 1983) ("Most, if not all, inventions are combinations and mostly of old elements."). Therefore an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be "an illogical and inappropriate process by which to determine patentability." *Sensonics, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570, 38 USPQ2d 1551, 1554 (Fed. Cir. 1996). To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed. [emphasis added.]

¹³ MPEP § 2143.01 "Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge of one of ordinary skill in the art."

There has been no such showing of those required reasons made in the final rejection.

In view of the above-noted distinctions, Applicant respectfully submits that Claims 15 patentably distinguishes over Kochiyama, Stein, and Wagstaff, taken alone or in proper combination. In addition, Applicant respectfully submits that Claims 24 and 29 (and Claims 25-28 and 30-33) patentably distinguish over Kochiyama, Stein, and Wagstaff, taken alone or in proper combination, for at least the reasons stated for Claim 15.

Accordingly, in view of the previous discussion and in view of the present amendment, Applicant respectfully submits the present application is in condition for allowance and respectfully requests an early and favorable action to that effect.

Respectfully submitted,

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